MultiConnect® Cell

User Guide

MultiConnect˚Cell User Guide

Model: MTC-C2

Part Number: S000564 1.0.5

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Warranty

To read the warranty statement for your product, visit www.multitech.com/warranty.go. For other warranty options, visit www.multitech.com/es.go.

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Contents

Product Overview

About the MultiConnect Cell Modem

The MultiConnect® Cell cellular MTC-C2 modems are ready-to-deploy, standalone dual-band CDMA 1 x RTT modems that provide wireless data communication. The modems integrate seamlessly with virtually any application, and are useful for automated applications, such as remote diagnostics and remote monitoring. They are available with RS-232 or USB connectors. The MultiConnect Cell cellular modems are based on industry-standard open interfaces.

Serial

USB
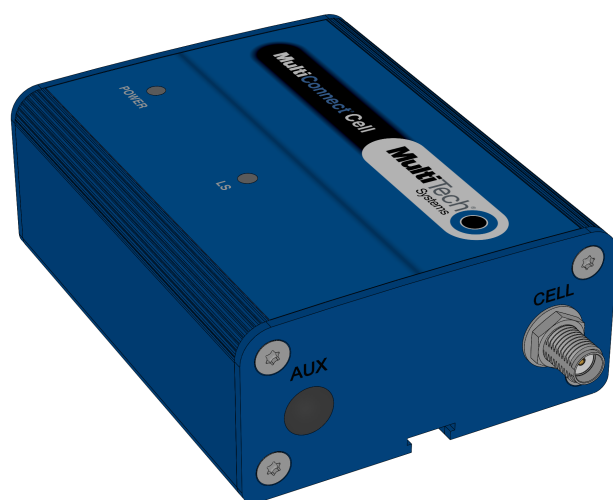
Documentation

The following documentation is available on the Multi-Tech Installation Resources website at www.multitech.com/setup/product.go.

Document	Description
MultiConnect Cell User Guide	This document. Provides an overview, safety and regulatory information, schematics, and general device information.
EV-DO EV3 and CDMA C2 AT Commands Reference Guide	You can configure the MTC-C2 device using the CDMA C2 AT Commands. These commands are documented in the Reference Guide part number S000546.

Descriptions of LEDs

Devices that have a serial connector have the following LEDs:

- Power
- TR
- CD
- LS

Devices that have a USB connector have the following LEDs:

- Power
- LS

The tables that follow provide details about what the LEDs indicate.

Power

Not lit	DC power not present.
Lit	DC power present.

TR (Terminal Ready)

Not Lit	Data is not being transmitted.
Lit	Blinks when data is being transmitted.

CD (Carrier Detect)

Not lit	Data connection is not established.
Lit	Data connection is established.

LS (Link Status)

Not lit	There is no power to the cellular radio.
Continuously lit	Powered and connected, but not transmitting or receiving.
Slow blink	Powered and searching for a connection.
Fast blink	Transmitting or receiving.

Side Panels

The device has connectors on either side. The figures that follow show the side panels.
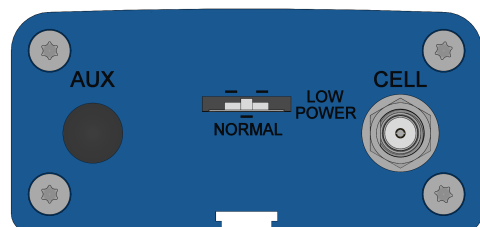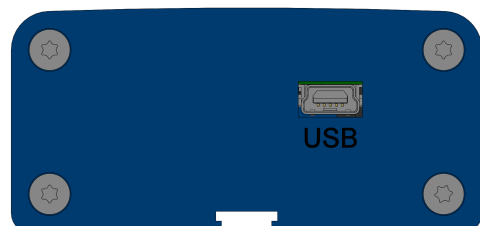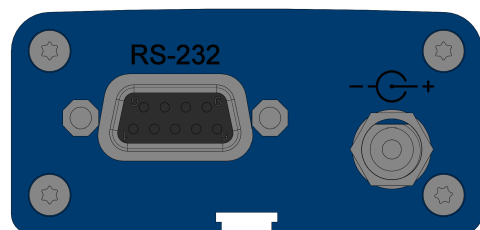
> **Note:** The power-saving switch—which appears with the NORMAL and LOW POWER labels—is included only on models that have a serial connector.

Specifications

MTC-C2

Category	Description
General	
Performance	CDMA2000 1xRTT
Frequency Bands	Dual-band 800/1900 MHz
Speed	
Packet Data	Up to 153 Kbps downlink and uplink
SMS	
SMS	Point-to-Point Messaging
	Mobile-Terminated SMS
	Mobile-Originated SMS

Category	Description
Connectors	
Cellular	Female SMA
RS-232	DE9
USB	Mini-B, USB 2.0 high speed or better
Power	2.5 mm miniature screw-on, RS-232 models
Power Requirements	
Voltage	Serial: 7 V to 32 V DC USB 5 V
Physical Description	
Dimensions	Dimensions are shown in the section "Dimensions" that follows.
Weight	8.2 ounces or 230 grams
Environment	
Operating Temperature	-40° C to +85° C
Humidity	Relative humidity 15% to 93% non-condensing
Certifications, Compliance, Warranty	
EMC Compliance	FCC Part 15 Class B
Network Compliance	Verizon
Warranty	Two years

Power Draw MTC-C2

USB

5 volts	Cellular call box connection no data (amps)	Average measured current (amps) at maximum power	Peak TX amplitude current (amps)	Total inrush charge measured in MilliCoulombs (mC)
US Cellular 800 Mhz	0.050	0.520	0.572	1.26
US PCS 1900 Mhz	0.050	0.683	0.736	1.26

Serial

	Low power mode current (amps)	Cellular call box connection no data (amps)	Average measured current (amps) at maximum power	Peak TX amplitude current (amps)	Total inrush charge measured in MilliCoulombs (mC)
7 volts					
US Cellular 800 Mhz	0.010	0.035	0.350	0.395	0.049
US PCS 1900 Mhz	0.010	0.035	0.450	0.505	0.049
9 volts					
US Cellular 800 Mhz	0.010	0.028	0.259	0.300	0.030
US PCS 1900 Mhz	0.010	0.028	0.348	0.404	0.030
32 volts					
US Cellular 800 Mhz	0.004	0.012	0.090	0.140	0.013
US PCS 1900 Mhz	0.004	0.012	0.112	0.164	0.013

Dimensions

DIMENSIONS IN In [mm]

CELL AUX

.260[6.60]
.300[7.62]
.170[4.32]

.393[9.97] REF.

MultiConnect® Cell

LS

POWER

4.925[125.10]
5.415[137.54]

3.171[80.54]

.400[10.16]

USB

1.163[29.54]

2.450[62.23]
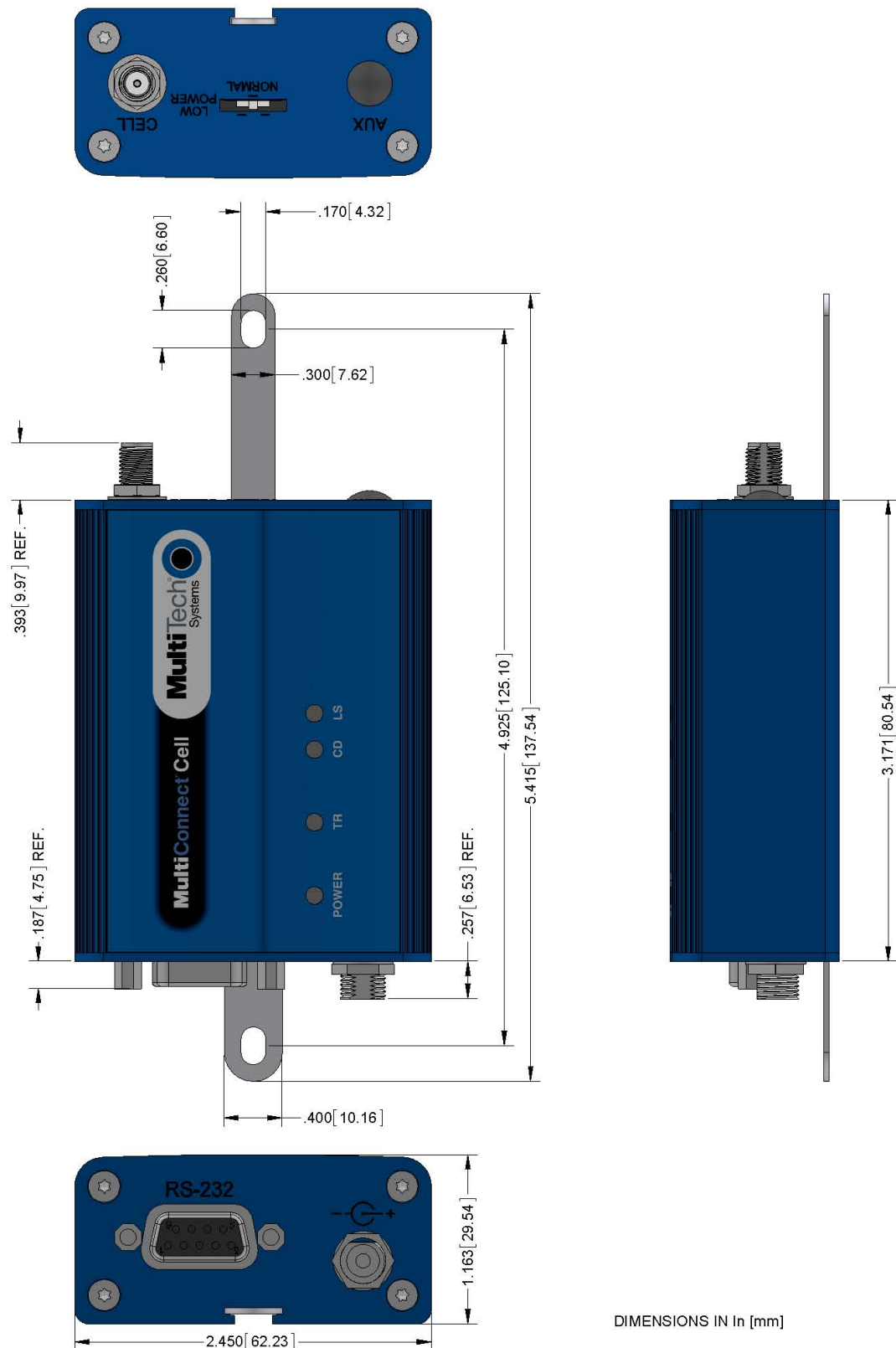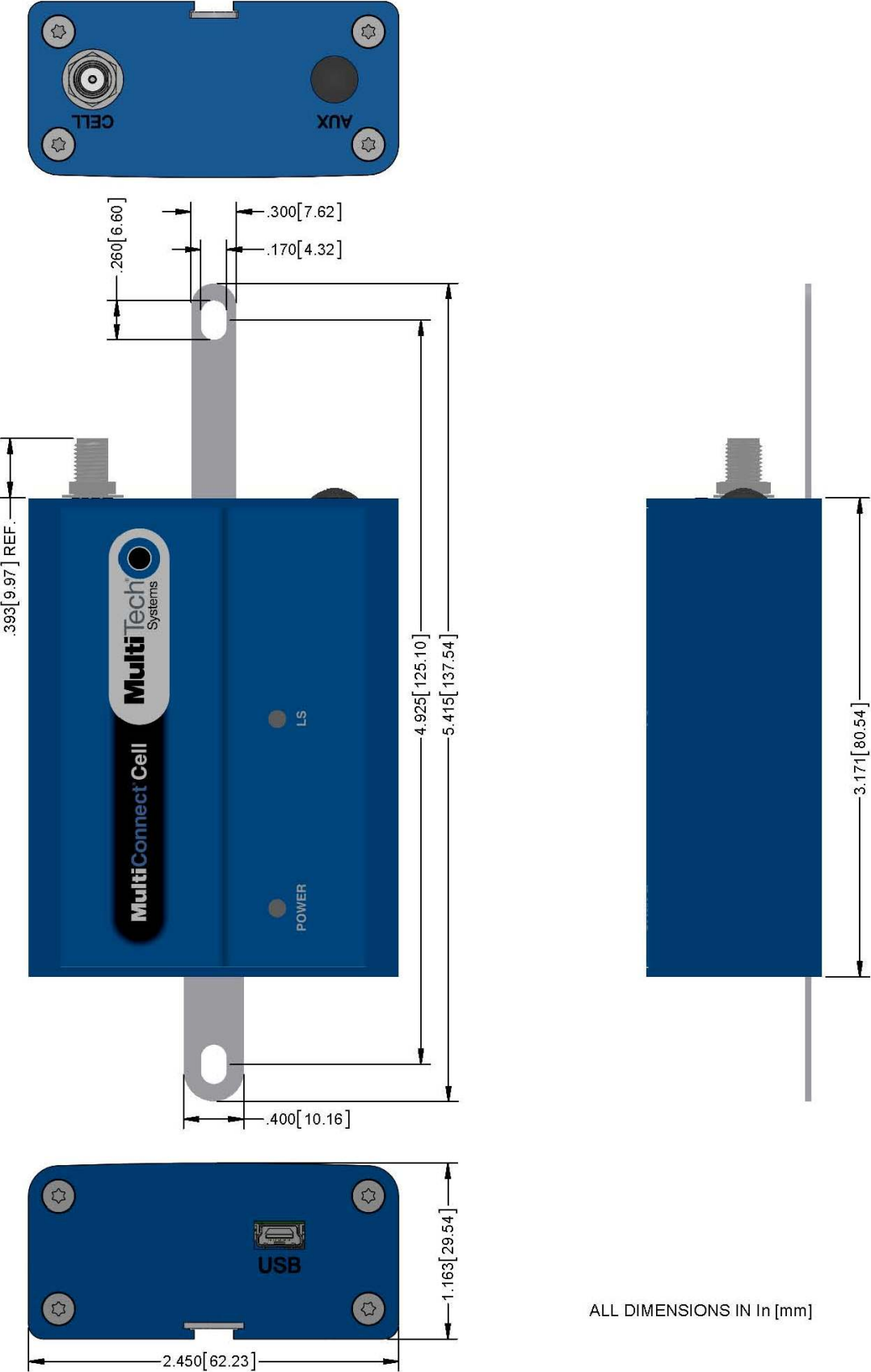
ALL DIMENSIONS IN In [mm]

Cellular Information

Antenna

The antenna intended for use with this unit meets the requirements for mobile operating configurations and for fixed mounted operations, as defined in 2.1091 and 1.1307 of the FCC rules for satisfying RF exposure compliance. If an alternate antenna is used, consult user documentation for required antenna specifications.

CDMA Antenna Information

CDMA devices were approved with the following antenna:

Exceltek Electronics, Ltd.

Description: Quad band antenna

Part number: C0081-ANG0002

Multi-Tech part number: 45009713L

CDMA Antenna Requirements/Specifications

Frequency range	824-894 MHz / 1850-1900 MHz
Impedance	50 ohm
VSWR	Make sure VSWR does not exceed 2.0.1 at any point across the bands of operation
Typical antenna gain	2 dBi on azimuth plane
Radiation pattern	Omni directional
Polarization	Vertical

Installing and Using the Device

Installing the Device

1. Connect a suitable antenna to the antenna connector.
2. If you are using the serial version of this device:

   Connect the DE9 connector (9-pin) of the RS-232 cable to the RS-232 connector on the device, then connect the other end to the serial port on the other desired device.

   Screw-on the power lead from the power supply module into the power connection on the device.

   Plug the power supply into your power source.
3. If you are using the USB version of this device:

   For information about the USB cable that helps power your device, see the section "USB Cable Recommendations."

   The USB cable uses power from the USB power line. Connect one end of the USB cable to your computer or other USB high power device, such as a hub.

   Connect the other end to the device's USB connector.
4. The POWER LED lights after the device powers up.

Placing Serial Devices in Power Save Mode

You can place devices that have a serial connector in low power mode. When the device is in low power mode—which is also sometimes called sleep mode or power save mode—the device's radio is operating with little power. A power save switch on the device determines if the device's radio can operate in normal or low power mode.

You might want your device to go into low power mode if batteries are used to power the device. For example, you might want to use your device outdoors, and have it powered by a solar charged battery. By using low power, you can save time and money by not having to replace batteries on devices operating in the field.

You can use many techniques to place the device into low power (sleep) mode. This example uses data terminal ready (DTR) and the AT command +CFUN=5. For other techniques, review the AT command guide for your device, as described in the Documentation topic in this guide.

You can make the device "wake up" from sleep mode by using the wake-on-ring feature: In the example that follows, the ring indicator line wakes the host processor when the radio receives an incoming call or SMS message. Your application then needs to act on the ring indication and wake up the device by asserting DTR.

Using Low Power Mode

To set up the device so it can be placed into low power mode:

1. Set the power-save switch to LOW.
2. On the RS-232 interface, ensure your application controls DTR and makes it active (on). To configure the device for DTR control, issue either AT&D1 or &D2 for DTR control. The &D0 command does not allow low power to operate.
3. To configure the device to enter low power (sleep) mode, issue AT+CFUN=5 to the radio.
4. To configure the device to wake from low power mode by using the wake-on-ring feature, issue AT#E2SMSRI=1000. This configures the ring indicator to go active for 1000 ms when an SMS message is received.

5. To have the device enter sleep mode, set DTR to inactive (off) on the RS-232 interface. The clear to send (CTS) signal is off when the device is in sleep mode.

USB Cable Recommendations

If your device has a USB connector, to avoid enumeration or power issues:

■ Use a high speed USB cable that is as short as possible.

■ Use a well shielded cable with at least 24 AWG wire pair for power/ground and 28 AWG wire pair for data lines.

■ If possible, use a USB port that connects directly to the motherboard rather than a USB port with added cabling inside the computer chassis.

■ Use USB 3.0 ports if available. These ports are typically rated for more current.

■ You can re-order the USB cable through Multi-Tech. The part number is CA-USB-A-MINI-B-3

Mounting Device to Flat Surface

1. Locate the groove on the bottom of the device.
2. Slide the mounting rod through the groove.
3. To secure the rod to the desired surface, place and tighten two screws in the holes on either end of the mounting rod. The dimensions illustration in this guide shows the mounting rod, as well as the dimensions for placement of the screws.

Installing Device Drivers

Installing on Linux

The Linux OS includes a generic USB driver for modems supporting CDC/ACM.

Multi-Tech tested the following Linux operating systems and all used port . If your system has another device using this port, your port numbers may be different.

- Ubuntu
- Debian
- Centos

To install the device on any Linux Kernel with CDC/ACM support, connect USB cable from the device to a USB port on your computer. For most recent Linux distributions, there are no drivers to install.

Troubleshooting Linux

If Linux does not create devices, check for the kernel module:

lsmod | grep option

If entries aren't found, load the kernel module with root privileges:

modprobe option

If this returns an error response, such as # FATAL: Module option not found, the kernel module is not on your system. You will need to build the driver.

Building a Linux Driver

If the Linux driver is not recognized by your system, the driver may need to be customized for your device.

> **Note:** To avoid runtime loading, build the driver as part of the kernel instead of as a module.

1. Retrieve the appropriate kernel source code version for your system. This should be in your OS distribution package. Unpack/install it.
2. In the root directory open the file: **/drivers/usb/serial/option.c**
3. Check for the existence of the proper #define statement.
   #define TELIT_PRODUCT_CE910_DUAL 0x1010
4. If the define statement is missing, add it and then add the following in the usb_device_id option_ids[]:
   { USB_DEVICE(TELIT_VENDOR_ID, TELIT_PRODUCT_CE910_DUAL) }
5. Save changes and close the file.
6. From the unpacking root directory, type **# make menuconfig**
7. Configure the kernel according to the considered system configuration.
8. Browse to menu **Device Driver > USB Support > USB Serial Converter support** and select **USB driver for GSM and CDMA modems**.
9. To start the build once configured, type **# make**

The kernel module option.ko is in the directory drivers/usb/serial. If the kernel was built previously, compile the module by typing: **# make M=drivers/usb/serial**

To load the module use modprobe or insmod.

Windows Notes

Installing on USB Host Powered Devices

When you connect a USB host powered device to a computer through a USB cable, the Windows **Add New Hardware Wizard** may display **Cannot Install this Hardware**. If this occurs, click **Finish**. Windows detects additional devices and prompts you to install them.

Downloading the Windows USB Driver

If you haven't downloaded the driver:

1. Go to the Multi-Tech Support page, www.multitech.com/support.go and select your product from the Product Families drop down list.
2. Click **Drivers**.
3. Extract the files to your computer.

Installing on Windows 8, 7 or Vista

This process installs multiple drivers and ports.

Note: If you previously installed USB drivers for this device, uninstall them before installing or re-installing this driver. Uninstall all existing drivers for this device. Refer to Uninstall Windows Drivers for details.

Before you connect the device (disconnect the device if you connected it):

CAUTION: If you connected the device before installing the drivers, Windows may install drivers automatically. Your device may not operate correctly with these drivers. Uninstall the drivers before proceeding. See Remove Microsoft Installed Drivers for details.

1. Click **Yes** or **Allow** to allow the installer to make changes to your computer.
2. Click **Next** and follow the instructions in the installation wizard.
3. Click the **Install** option when prompted, for example, Install this driver software anyway.
4. Click **Finish.**
5. Connect USB cable from the device to a USB port on your computer. Windows indicates when the device is ready to use.

Installing on Windows XP

Note: If you previously installed USB drivers for this device, uninstall them before installing or re-installing this driver. Uninstall all existing drivers for this device. Refer to Uninstall Windows Drivers for details.

Before you connect the device (disconnect the device if you connected it):

1. Click **Next** and follow the instructions in the installation wizard.
2. Click **Continue Anyway** each time this screen appears.

3. Click **Finish.**
4. Connect USB cable from the device to a USB port on your computer. After it detects the hardware, Windows opens the New Hardware Wizard.
5. Select **No, not this time** and click **Next.**
6. Select **Install the software automatically (Recommended)** and click **Next.**
7. Select **Finish.**
8. Repeat for each additional New Hardware Wizard. Windows indicates when the device is ready to use.

Uninstalling Windows Drivers

Note: Disconnect the device before uninstalling drivers.

Windows 8

To uninstall drivers from Windows 8:

1. Open Windows **Programs and Features**.
2. Uninstall all **Telit modems, ports, and USB drivers**.

Windows 7 or Vista

To uninstall drivers from Windows 7 or Vista:

1. Open **Programs and Features** from the Windows Control Panel.
2. Uninstall the **Windows Driver Package – Telit Wireless Solutions (telitusbser) Modem**.
3. Uninstall all **Telit modems, ports, and USB**.

Windows XP

To uninstall drivers from Windows XP:

1. Open the **Control Panel** and go to **Add or Remove Programs**.
2. Uninstall **Windows Driver Package – Telit Wireless Solutions (telitusbser) Modem**.
3. Uninstall all other **Telit modems, Ports and USB**.

Antenna and Activation Information

Antenna System Cellular Devices

The cellular/wireless performance depends on the implementation and antenna design. The integration of the antenna system into the product is a critical part of the design process; therefore, it is essential to consider it early so the performance is not compromised. If changes are made to the device's certified antenna system, then recertification will be required by specific network carriers.

Requirements for Cellular Antennas with regard to FCC/IC Compliance

There cannot be any alteration to the authorized antenna system. The antenna system must maintain the same specifications. The antenna must be the same type, with similar in-band and out-of-band radiation patterns.

Account Activation for Cellular Devices

Some Multi-Tech cellular modems are pre-configured to operate on a specific cellular network, such as Sprint or Verizon Wireless. Before you can use the modem, you must set up a cellular data account with your service provider. Each service provider has its own process for adding devices to their network. Refer to Multi-Tech's Cellular Activation site http://www.multitech.com/activation.go for step-by-step instructions on activating your cellular modem with your service provider.

Device Phone Number

Every device has a unique phone number. Your service provider supplies a phone number when you activate your account, or if your device has a SIM card, the phone number may be on it. Wireless service provider implementation may vary. Consult with your service provider to get the phone number for your device.

Creating a Windows Dial-Up Connection

Each version of the Windows operating system has different steps for creating dial-up Internet connections. Consult Windows Help for the specific steps for your version.

You need the phone number, username, and password for your ISP.

Using Linux

Shell Commands

Testing Serial Ports

To test the serial ports created by the driver, type in a shell:

> **Note:** Sending ATE0 is required, to avoid issues in the terminal output. It prevents the sending/receiving spurious characters to/from the modem when used with the Linux commands "echo" and "cat"

Create a PPP Connection

Most recent Linux distributions have GUI tools for creating PPP connections; the following instructions are for creating a PPP connection through command line interface.

PPP support must be compiled into the kernel; pppd and chat programs are also required.

pppd needs two scripts: the first script performs the environment setting and calls the second script, which is used by the chat program. For creating a PPP connection type:

pppd file /etc/pppd_script &

Example

```
# Debug info from pppd
debug
#kdebug 4
# Most phones don't reply to LCP echos
lcp-echo-failure 3
lcp-echo-interval 3
# Keep pppd attached to the terminal
# Comment this to get daemon mode pppd
nodetach
# The chat script (be sure to edit that file, too!)
connect "/usr/sbin/chat -v -f "
# Serial Device to which the modem is connected
/dev/
# Serial port line speed
115200
dump
# The phone is not required to authenticate
#noauth
user <insert here the correct username for authentication>
name <insert here the name of the connection>
password <insert here the correct password for authentication>
# If you want to use the  link as your gateway
defaultroute
# pppd must not propose any IP address to the peer
#noipdefault
ipcp-accept-local
```

```
ipcp-accept-remote
# Keep modem up even if connection fails
#persist
# Hardware flow control
crtscts
# Ask the peer for up to 2 DNS server addresses
usepeerdns
# No ppp compression
novj
nobsdcomp
novjccomp
nopcomp
noaccomp
# For sanity, keep a lock on the serial line
lock
# Show password in debug messages
show-password
```

This script calls the option *connect* using the script , for example: After launching a PPP connection is possible to use ftp protocol or other utilities that allow the access to the Internet.

Configuring and Communicating with Your Device

Interacting with Your Device Overview

This section describes how to use AT commands to interact with your device. Using terminal software such as Kermit, you can issue AT commands to communicate with and configure your modem. The AT commands let you establish, read and modify device parameters and help you control how the device operates. This section documents basic interactions with your device, such as verifying signal strength and network registrations, sending and reading SMS text messages, and sending and receiving data.

Your device supports Windows and Linux operating systems. If you use Windows, download and install the USB drivers. See Installing Drivers for details. If you use Linux, your device is CDC-ACM compliant. Linux since version 2.6.28 has included CDC-ACM drivers, so additional drivers are not needed. See Using Linux for getting started with Linux.

Generally, USB modems are used as unintelligent bit pipes. In Windows, this means you create a dial-up network connection that uses the Windows IP stack to use the modem to create a PPP connection to the cellular network. The modem is assigned an IP address from the cellular carrier. This connection provides Internet access and is the basis for TCP/IP communication for sending and receiving email, creating TCP/UDP Sockets, or putting and getting files from an FTP server.

In Linux, PPPD is used to dial the modem and create the connection to the cellular TCP/IP network. This provides Internet access for sending and receiving email, creating TCP/UDP Sockets, or putting and getting files from an FTP server.

Before You Begin

Before you begin:

- Power up your device and ensure it is connected to the computer that you use to issue AT commands.
- Install terminal software that can communicate with the device, such as HyperTerminal, TerraTerm, Kermit, or Putty.

Using Command Mode and Online Data Mode

Modems have two operation modes, command and online data. When you power up the modem it is in command mode and ready to accept AT commands.

Use AT commands to communicate with and configure your modem. They allow you to establish, read, and modify device parameters and control how the modem works. The device can also generate responses to AT commands that help determine the modem's current state.

If the modem is online data mode, it only accepts the Escape command (+++).

To send the modem AT Commands from terminal emulation software, set the software to match the modem's default data format, which is:

- Speed: 115,200 bps
- Data bits: 8
- Parity: none
- Stop bit: 1

■ Flow control: hardware

To confirm you are communicating with the device:

■ Type **AT** and press **Enter**.

If the device responds with OK, you are communicating with the device.

Verifying Signal Strength

To verify the device signal strength, enter:

AT+CSQ

The command indicates signal quality, in the form:

+CSQ: <rssi>,<ber>

Where:

<rssi>	Received signal strength indication.
0	(-113) dBm or less
1	(-111) dBm
2-30	(-109) dBm - (-53) dBm / 2 dBm per step
31	(-51) dBm or greater
99	Not known or not detectable
<ber>	Bit error rate, in percent
0	Less than 0.2%
1	0.2% to 0.4%
2	0.4% to 0.8%
3	0.8% to 1.6%
4	1.6% to 3.2%
5	3.2% to 6.4%
6	6.4% to 12.8%
7	More than 12.8%
99	Not known or not detectable

Note: Signal strength of 10 or higher is needed for successful packet data sessions.

Example

A example response to AT+CSQ:

+CSQ: 15,1

Checking Network Registration for EV2 and C2

To verify that a device is registered on the network, enter:

AT!STATUS

The device returns several lines of modem status information. The second to last line indicates either:

Modem has registered.

or

Modem has NOT registered.

Sending and Receiving Data

Connecting Device to TCP Server as TCP Client

To send data through a connect socket:

1. **Bring up Data Connection Using Internal IP stack**
   Enter:
   AT#SGACT=1,1
   The device responds with the IP Address the cellular provider assigned to the device on connection, followed by OK. For example:
   #SGACT: 25.194.185.116
   OK

Closing the Socket and the Connection

To close the socket:

- ■ Enter the escape sequence:+++

- ■ To close Socket 1, enter:AT#SH=1

The device responds with OK.

To close the data connection:

- ■ Enter: AT#SGACT=1,0

The device responds with OK.

Configuring Device as UDP Listener to Accept UDP Client Connections

To configure the device as a UDP client:

1. **Check signal strength.**
   Enter:

AT+CSQ

2. **Verify device is registered on the cellular network.**

   Enter:

   AT!STATUS

3. **Configure socket parameters**

   Enter:

   AT#SCFG=1,1,300,240,600,50

4. **Activate context one**

   Enter:

   AT#SGACT=1,1

5. **Set firewall rule to accept connections:**

   AT#FRWL=1,"###.##.###.#","###.##.###.#" where ###.##.###.# represents the IP range. For example:

   AT#FRWL=1,"204.26.122.1","204.26.122.255"

6. **Set connection ID 1 for UDP listening mode on port 7000.**

   Enter:

   AT#SLUDP=1,1,7000

   The device responds with and unsolicited indication that a host is trying to connect to connection ID 1 on port 7000.

   SRING: 1

7. **Accept incoming connection ID 1**

   Enter:

   AT#SA=1

   The device indicates a client successfully established a listener connection.

   CONNECT

   You can send and receive data.

Exit Data Mode and Close Connection

To exit data mode and close the socket:

- Enter the escape sequence: +++

- To close Socket 1, enter: AT#SH=1

The device responds with OK.

- To close the data connection, enter:AT#SGACT=1,0

The device responds with OK.

Configuring Device as UDP Client to Connect to UDP Server

Configure and Connect the Device

To configure the device as a UDP client:

1. **Check signal strength.**

   Enter:

   AT+CSQ

2. **Verify device is registered on the cellular network.**

   Enter:

   AT!STATUS

3. **Configure socket parameters**

   Enter:

   AT#SCFG=1,1,300,240,600,50

4. **Activate context one**

   Enter:

   AT#SGACT=1,1

5. **Create UDP connection to Server port**

   Enter:

   AT#SD=1,1,####,"###.##.###.##" where #### is the server port and ###.##.###.## is the IP number.

The device responds with OK, which indicates a successful connection. You can send and receive data through the socket connection.

Exit Data Mode and Close Connection

To exit data mode and close the socket:

- Enter the escape sequence: +++

- To close Socket 1, enter: AT#SH=1

The device responds with OK.

- To close the data connection, enter:AT#SGACT=1,0

The device responds with OK.

Configuring Device as UDP Listener to Accept UDP Client Connections

To configure the device as a UDP client:

1. **Check signal strength.**

   Enter:

   AT+CSQ

2. **Verify device is registered on the cellular network.**

   Enter:

   AT!STATUS

3. **Configure socket parameters**

   Enter:

   AT#SCFG=1,1,300,240,600,50

4. **Activate context one**

   Enter:

   AT#SGACT=1,1

5. **Set firewall rule to accept connections:**

   AT#FRWL=1,"###.##.###.#","###.##.###.#" where ###.##.###.# represents the IP range. For example:

   AT#FRWL=1,"204.26.122.1","204.26.122.255"

6. **Set connection ID 1 for UDP listening mode on port 7000.**

   Enter:

   AT#SLUDP=1,1,7000

   The device responds with and unsolicited indication that a host is trying to connect to connection ID 1 on port 7000.

   SRING: 1

7. **Accept incoming connection ID 1**

   Enter:

   AT#SA=1

   The device indicates a client successfully established a listener connection.

   CONNECT

   You can send and receive data.

Exit Data Mode and Close Connection

To exit data mode and close the socket:

- Enter the escape sequence: +++

- To close Socket 1, enter: AT#SH=1

The device responds with OK.

- To close the data connection, enter:AT#SGACT=1,0

The device responds with OK.

Transferring FTP File to FTP Server

To connect to FTP server and upload files:

1. **Check signal strength.**

   Enter:

   AT+CSQ

2. **Activate context one**

   Enter:

   AT#SGACT=1,1

3. **Set FTP operations timeout to 10 seconds**

   Enter:

   AT#FTPTO=1000

4. **Configure FTP server IP address with username and password.**

   Enter:

   AT#FTPOPEN="###.##.###.#","username","password",0 where ###.##.###.# is the IP address and the username and password for the FTP server.

5. **Configure file transfer type.**

   Enter:

   AT#FTPTYPE=# where # is 0 for binary or 1 for ASCII.

6. **Enter the file name to be sent to the FTP server and initiate connection.**

Enter:

AT#FTPPUT="file.txt"

The device responds with:

CONNECT

7. Send the file through the device.

Closing the FTP Data Connection

When you finish sending the file:

1. **Enter the escape sequence.**

    Enter:

    +++

    The device responds with:

    NO CARRIER

2. **Close the FTP connection.**

    Enter:

    AT#FTPCLOSE

3. **Close the PPP data connection.**

    Enter:

    AT#SGACT=1,0

    The device responds with OK.

Downloading File from FTP Server

To connect to an FTP server and download files:

1. **Check signal strength.**

    Enter:

    AT+CSQ

2. **Activate context one**

    Enter:

    AT#SGACT=1,1

3. **Set FTP operations timeout to 10 seconds**

    Enter:

    AT#FTPTO=1000

4. **Configure FTP server IP address with username and password.**

    Enter:

    AT#FTPOPEN="###.##.###.#","username","password",0 where ###.##.###.# is the IP address and the username and password for the FTP server.

5. **Configure file transfer type.**

    Enter:

    AT#FTPTYPE=# where # is 0 for binary or 1 for ASCII.

6. **If required, change the working directory to "folder1".**

    Enter:

AT#FTPCWD="folder1"

7.   Enter the file name.

Enter:

AT#FTPGET="filename.txt" where filename.txt is the file you want to download.

The device responds with:

CONNECT

The file is received through the device. The device responds with:

NO CARRIER

The data connection closes automatically when the file sending ends.

Closing the FTP Data Connection

When you finish sending the file:

1.   Close the FTP connection.

Enter:

AT#FTPCLOSE

2.   Close the PPP data connection.

Enter:

AT#SGACT=1,0

The device responds with OK.

Reading, Writing and Deleting Messages

Reading Text Messages

To read a text message in text mode:

1.   Put the device in text mode.

Enter: AT+CMGF=1

2.   Read message.

Enter: AT+CMGR=1

Example response:

+CMGR: "REC UNREAD","+16155554562z`z","","13/09/05,13:39:40-20"
How are you?
OK

Sending Text Messages

To send a text message in text mode:

1.   Put the device in text mode.

Enter:

AT+CMGF=1

The device responds.

OK

2.   Enter the recipient's number and your message.

Enter:

AT+CMGS="##########"
 >Your message here

where ########## is the recipient's number.

3. **Send the message.**

Enter CTRL+Z.

The device responds:

+CMGS: 255
OK

For example:

AT+CMGF=1
OK
AT+CMGS="6155554563"
> How are you?   <CTRL+Z to send>
+CMGS: 255
OK

Deleting Messages

To delete one text message, enter:

AT+CMGD=I,#

where I is the index in the select storage and # is the delflag option. Enter:

0	Deletes message in the specified index.
1	Deletes all read messages. Leaves unread messages and stored device-originated messages.
2	Deletes all read and sent device-originated messages. Leaves unread messages and unsent device-originated messages.
3	Deletes all read messages and sent and unsent device-orginated messages. Leaves unread messages.
4	Deletes all messages.

For example:

AT+CMGD=1 (delete message at index 1)
AT+CMGD=2 (delete message at index 2)
AT+CMGD=1,0
AT+CMGD=1,1
AT+CMGD=1,2
AT+CMGD=1,3
AT+CMGD=1,4

Regulatory Information

47 CFR Part 15 Regulation Class B Devices

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Industry Canada Class B Notice

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Reglement Canadien sur le matériel brouilleur.

This device complies with Industry Canada RSS Appliance radio exempt from licensing. The operation is permitted for the following two conditions:

1. the device may not cause harmful interference, and
2. the user of the device must accept any interference suffered, even if the interference is likely to jeopardize the operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage, et
2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

REACH Statement

Registration of Substances

After careful review of the legislation and specifically the definition of an "article" as defined in EC Regulation 1907/2006, Title II, Chapter 1, Article 7.1(a)(b), it is our current view Multi-Tech Systems, Inc. products would be considered as "articles". In light of the definition in § 7.1(b) which requires registration of an article only if it contains a regulated substance that "is intended to be released under normal or reasonably foreseeable conditions of use," Our analysis is that Multi-Tech Systems, Inc. products constitute nonregisterable articles for their intended and anticipated use.

Substances of Very High Concern (SVHC)

Per the candidate list of Substances of Very High Concern (SVHC) published October 28, 2008 we have reviewed these substances and certify the Multi-Tech Systems, Inc. products are compliant per the EU "REACH" requirements of less than 0.1% (w/w) for each substance. If new SVHC candidates are published by the European Chemicals Agency, and relevant substances have been confirmed, that exceeds greater than 0.1% (w/w), Multi-Tech Systems, Inc. will provide updated compliance status.

Multi-Tech Systems, Inc. also declares it has been duly diligent in ensuring that the products supplied are compliant through a formalized process which includes collection and validation of materials declarations and selective materials analysis where appropriate. This data is controlled as part of a formal quality system and will be made available upon request.

Waste Electrical and Electronic Equipment Statement

WEEE Directive

The WEEE Directive places an obligation on EU-based manufacturers, distributors, retailers, and importers to take-back electronics products at the end of their useful life. A sister directive, ROHS (Restriction of Hazardous Substances) complements the WEEE Directive by banning the presence of specific hazardous substances in the products at the design phase. The WEEE Directive covers all Multi-Tech products imported into the EU as of August 13, 2005. EU-based manufacturers, distributors, retailers and importers are obliged to finance the costs of recovery from municipal collection points, reuse, and recycling of specified percentages per the WEEE requirements.

Instructions for Disposal of WEEE by Users in the European Union

The symbol shown below is on the product or on its packaging, which indicates that this product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.

July, 2005

Information on HS/TS Substances According to Chinese Standards

In accordance with China's Administrative Measures on the Control of Pollution Caused by Electronic Information Products (EIP) # 39, also known as China RoHS, the following information is provided regarding the names and concentration levels of Toxic Substances (TS) or Hazardous Substances (HS) which may be contained in Multi-Tech Systems Inc. products relative to the EIP standards set by China's Ministry of Information Industry (MII).

Hazardous/Toxic Substance/Elements

Name of the Component	Lead (PB)	Mercury (Hg)	Cadmium (CD)	Hexavalent Chromium (CR6+)	Polybrominated Biphenyl (PBB)	Polybrominated Diphenyl Ether (PBDE)
Printed Circuit Boards	O	O	O	O	O	O
Resistors	X	O	O	O	O	O
Capacitors	X	O	O	O	O	O
Ferrite Beads	O	O	O	O	O	O
Relays/Opticals	O	O	O	O	O	O
ICs	O	O	O	O	O	O
Diodes/ Transistors	O	O	O	O	O	O
Oscillators and Crystals	X	O	O	O	O	O
Regulator	O	O	O	O	O	O
Voltage Sensor	O	O	O	O	O	O
Transformer	O	O	O	O	O	O
Speaker	O	O	O	O	O	O
Connectors	O	O	O	O	O	O
LEDs	O	O	O	O	O	O
Screws, Nuts, and other Hardware	X	O	O	O	O	O
AC-DC Power Supplies	O	O	O	O	O	O
Software /Documentation CDs	O	O	O	O	O	O
Booklets and Paperwork	O	O	O	O	O	O
Chassis	O	O	O	O	O	O

X Represents that the concentration of such hazardous/toxic substance in all the units of homogeneous material of such component is higher than the SJ/Txxx-2006 Requirements for Concentration Limits.
O Represents that no such substances are used or that the concentration is within the aforementioned limits.

Information on HS/TS Substances According to Chinese Standards (in Chinese)

依照中国标准的有毒有害物质信息

根据中华人民共和国信息产业部 (MII) 制定的电子信息产品 (EIP) 标准－中华人民共和国《电子信息产品污染控制管理办法》（第 39 号），也称作中国 RoHS, 下表列出了 Multi-Tech Systems, Inc. 产品中可能含有的有毒物质 (TS) 或有害物质 (HS) 的名称及含量水平方面的信息。

有害/有毒物质/元素

成分名称	铅 (PB)	汞 (Hg)	镉 (CD)	六价铬 (CR6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板	O	O	O	O	O	O
电阻器	X	O	O	O	O	O
电容器	X	O	O	O	O	O
铁氧体磁环	O	O	O	O	O	O
继电器/光学部件	O	O	O	O	O	O
ICs	O	O	O	O	O	O
二极管/晶体管	O	O	O	O	O	O
振荡器和晶振	X	O	O	O	O	O
调节器	O	O	O	O	O	O
电压传感器	O	O	O	O	O	O
变压器	O	O	O	O	O	O
扬声器	O	O	O	O	O	O
连接器	O	O	O	O	O	O
LEDs	O	O	O	O	O	O
螺丝、螺母以及其它五金件	X	O	O	O	O	O
交流-直流电源	O	O	O	O	O	O
软件/文档 CD	O	O	O	O	O	O
手册和纸页	O	O	O	O	O	O
底盘	O	O	O	O	O	O

X 表示所有使用类似材料的设备中有害/有毒物质的含量水平高于 SJ/Txxx-2006 限量要求。
O 表示不含该物质或者该物质的含量水平在上述限量要求之内。